C-3.8 Explain the effect of electronegativity and ionization energy on the type of bonding in a molecule. (additional content/depth)

Revised Taxonomy Levels 2.7 B Explain conceptual knowledge

This topic was not addressed in physical science

It is essential for students to

- Infer relative electronegativity values for elements based on the element's position on the periodic table.
- Use a table of electronegativity values to assign values to elements represented in the structural formula of a substance.
- Determine the percent ionic character of a bond based on the electronegativity difference of the elements involved
- Understand how the electronegativity difference can be used to classify the type of bond in a substance
- Infer relative ionization energy values for elements based on the element's position on the periodic table.
- Use a table of ionization energy values to assign values to elements represented in the structural formula of a substance.
- Understand how the relative ionization energies of two elements can be used to predict the type of bonding that form between them.
- Interpret the polarity of a molecule based on its geometry bond type.

Assessment

The verb, explain means that the major focus of assessment should be for students to "construct a cause and effect model". In this case, assessments will ensure that students can model electronegativity values or ionization energy values to predict the type of bonds that will form between two elements. Because the indicator is written as conceptual knowledge, assessments should require that students understand the "interrelationships among the basic elements within a larger structure that enable them to function together." In this case, assessments must show that students can construct a cause and effect statement relating how the atomic structure of the element dictates its electronegativity and ionization energy values and that the student can make judgments concerning bond formation based on a comparison of either of these values.